City of Woburn

Contributory Retirement System

Actuarial Valuation Report	As of January 1, 2016

GASB 67 and 68 information

For the Sponsor’s Fiscal Year Ending	June 30, 2016

March 2017

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March 2017

Woburn Retirement Board
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Conduent Human Resource Services (Conduent), formerly Buck Consultants at Xerox, was retained to prepare an actuarial valuation of the Retirement System as of January 1, 2016. In addition, this report presents the disclosure requirements under Statements Nos. 67 and 68 of the Governmental Accounting Standards Board for the plan sponsor's fiscal year ending June 30, 2016 using a measurement date of December 31, 2015, the end of the plan's fiscal year.

Purpose of this Report

Conduent has prepared this report for the Board for use in review of the operation of the System, including the determination of contributions to be made to the System, and as a source of information for the financial statements of the System and of the City. The City may also use the report in the preparation of various regulatory filings.

Use of this report for any other purpose may not be appropriate and may result in mistaken conclusions due to failure to understand applicable assumptions, methodologies, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, Conduent recommends requesting an advance review of any statement, document, or filing based on information contained in this report. Conduent will accept no liability for any such statement, document or filing make without prior review by Conduent.

Where presented, references to "funded ratio" and "unfunded accrued liability" typically are measured on an actuarial-value-of-assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the System if it were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

Data Used

Conduent performed the calculations using participant data as of January 1, 2016 and financial data as of December 31, 2015 both supplied by the Retirement Board. Conduent did not audit the data, although they were reviewed for reasonableness and consistency with the prior years' data. The accuracy of the results of the valuation is dependent on the accuracy of the data.

Actuarial Certification

The actuarial assumptions used to value the plan for funding purposes were selected by us and are, individually and in the aggregate, reasonable and in combination represent my best estimate of anticipated experience under the plan. Note that the mortality assumption was revised for the funding calculations due to newly published information from the Society of Actuaries in 2015 regarding the continuing improvement in mortality evident in emerging experience. That change had already been implemented with respect to the GASB reporting information for 2015, so it has no impact on the development of the Total Pension Liability reported for GASB purposes. The change in this assumption increased the unfunded actuarial accrued liability of the System by approximately $6.9 million. In addition, the valuation rate and salary increase assumption were revised for this valuation based upon a review of recent experience and expectations with respect to future anticipated earnings along with the expected impact associated with recent collective bargaining agreements which contain lower salary increase rates in the near term. The reduction in the valuation interest rate increased the accrued liability by approximately $5.1 Million while the reduction in the salary increase assumption reduced it by approximately $1.3 Million. The remainder of the assumptions have been unchanged and are based upon earlier reviews of emerging experience. Since the plan provisions have changed for recent hires, it would be appropriate to conduct an experience study within the next 3-4 years to evaluate the effect of plan changes on emerging experience.

The plan sponsor selected the assumptions used for the accounting results and funding policy calculations in the report with our advice. We believe that these assumptions are reasonable and comply with the requirements of GASB 67 and 68. We prepared this report's accounting exhibits in accordance with the requirements of these standards.

Based on the foregoing, the cost results and actuarial exhibits for funding presented in this report were determined on a consistent and objective basis in accordance with applicable Actuarial Standards of Practice. Please see Exhibits 1-3 for relevant summaries of data, assumptions, methods and financial information pertinent to the plan.

The valuation was prepared under the supervision of David Driscoll, a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries and Hilja Viidemann, a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. They have both met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about it.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

Conduent Human Resource Services

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Report Summary

Highlights

	January 1, 2014	January 1, 2016
Contributions		
Funding Schedule FY 2017	$6,300,000	$6,300,000
Funding Schedule FY 2018	6,615,000	7,616,072
Funded Ratios		
GASB Statement No. 25[1]	64.6%	62.9%
Participants		
Actives	578	573
Retirees and Beneficiaries	369	397
Inactives	84	97
Disabled	31	35
Total	1,062	1,102
Payroll		
Payroll of Active Members	$28,945,300	$29,187,382
Average Payroll	50,078	50,938
Normal Cost		
Employer	$828,863	$1,239,532
Employee	2,472,416	2,556,636
Administrative Expenses	450,000	450,000
Total	$3,751,279	$4,246,168
Actuarial Accrued Liabilities		
Actives	$91,177,892	$93,875,220
Retirees, Beneficiaries, Disabilities and Inactives	88,269,550	111,649,067
Total	$179,447,442	$205,524,287
Actuarial Value of Assets	115,874,621	129,316,388
Unfunded Actuarial Accrued Liabilities	$63,572,821	$76,207,949

[1] GASB Statement 25 has been amended and superseded by Statement 67. This information is provided for comparison with the results of earlier valuations only.

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2016, of the Woburn Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2016.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Woburn Contributory Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the Massachusetts General Laws as of January 1, 2016.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Transfers between systems under Section 3(8)(c) of Chapter 32
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The cost of these benefits was assumed by the Commonwealth under Proposition 2 ½.

Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last two years, the total unfunded actuarial accrued liability increased by 19.9% to $76,207,949. The increase is the result of nominally unfavorable actuarial experience during the preceding years combined with liability changes associated with data adjustments. The primary change in the accrued liability was due to the revision in the mortality assumption. The sources of the (gain)/loss are as follows:

Investment Experience	(2,282,073)
Interest Rate	0
Salary Gain	(2,976,174)
New Entrants	251,138
Active Decrements (Retirement)	727,852
Active Decrements (Termination)	1,377,391
Active Decrements (Death)	(69,225)
Active Decrements (Disability)	641,436
Inactive Mortality and data adjustments	4,335,977
Mortality Assumption Revision	6,947,902
Salary Scale Assumption Revision	(1,302,423)
Interest Rate Assumption Revision	5,112,753
COLA experience	(1,605,118)
Other (Data corrections, Section 3(8)(c) transfers, buybacks, etc.)	672,735
Total (gain)/loss	11,832,171

Benefit changes approved under Chapter 176 of the Acts of 2011 for members hired on or after April 2, 2012 were reflected in this valuation. Since these changes apply to new hires, there is little immediate impact on past service liability.

Actuarial Costs and Liabilities

Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability and terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

Table I	January 1, 2014	January 1, 2016
Superannuation	$2,397,850	$2,760,396
Termination	212,812	244,795
Death	109,646	153,277
Disability	580,971	637,700
Administrative Expenses	450,000	450,000
Total Normal Cost	$3,751,279	$4,246,168
% of Pay	13.0%	14.5%
Employee Contributions	2,472,416	2,556,636
% of Pay	8.5%	8.8%
Employer Normal Cost	$1,278,863	$1,689,532
% of Pay	4.4%	5.8%

Actuarial Costs and Liabilities

Present Value of Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits attributable to the past service of actives and inactive participants in the System. The AAL can be compared to the System's assets to determine the funded status of the System. The value of these benefits by type and category of participation is shown in Table II below.

Table II	January 1, 2014	January 1, 2016
Actives		
Superannuation	$83,459,495	$86,012,070
Termination	893,854	843,818
Death	1,375,365	1,746,047
Disability	5,449,178	5,273,285
Retirees and Inactives		
Retirees and Beneficiaries	$77,967,643	$98,600,700
Terminated (Refund)	626,370	1,013,625
Disabled	9,675,537	12,034,742
Total	$179,447,442	$205,524,287

Actuarial Costs and Liabilities

Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by current active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. A breakdown of the present value of the total expected benefits by type and category of participation is shown in Table III.

Table III	January 1, 2014	January 1, 2016
Actives		
Superannuation	$102,181,890	$107,669,995
Termination	1,734,414	1,838,841
Death	2,187,229	2,894,616
Disability	10,533,997	10,983,215
Retirees and Inactives		
Retirees and Beneficiaries	$77,967,643	$98,600,700
Terminated (Refund)	626,370	1,013,625
Disabled	9,675,537	12,034,742
Total	$204,907,080	$235,035,734

Funded Status and Appropriations

Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

Table IV	January 1, 2014	January 1, 2016
Cash equivalents	$2,631,557	$3,534,910
Short term investments	119,752	120,593
Fixed income securities	19,550,910	22,783,453
Equities	41,730,821	41,238,831
International	26,834,553	25,542,106
Real Estate	11,072,669	11,317,528
Venture Capital	0	0
Other	23,330,582	19,387,889
Accounts receivable	20,824	78,807
Accounts payable	(104,245)	(113,939)
Accrued income	88,150	82,666
Total Market Value	$125,275,573	$123,972,843
Total Actuarial Value	$115,874,621	$129,316,388

Funded Status and Appropriations (continued)

Actuarial Value of Assets

The actuarial value of assets is determined by projecting the market value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (8.00%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a five-year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 20%. The calculation of the actuarial value of assets as of January 1, 2016 is presented in Table V.

Table V		January 1, 2016
(1)	Market value at January 1, 2015	$129,342,597
(2)	2015 Contributions	$9,319,427
(3)	2015 Payments	($13,177,785)
(4)	Net interest adjustment at 8.00% on (1), (2) and (3) to December 31, 2015	$10,180,213
(5)	Expected market value on December 31, 2015 (1) + (2) + (3) + (4)	$135,664,452
(6)	Actual market value on December 31, 2015	$123,972,843
(7)	2015 (Gain) / Loss	$11,691,609
(8)	80% of 2015 (Gain) / Loss	$9,353,287
(9)	2014 (Gain) / Loss	$2,279,558
(10)	60% of 2014 (Gain) / Loss	$1,367,735
(11)	2013 (Gain) / Loss	($11,188,722)
(12)	40% of 2013 (Gain) / Loss	($4,475,489)
(13)	2012 (Gain) / Loss	($4,510,189)
(14)	20% of 2012 (Gain) / Loss	($902,038)
(15)	Actuarial value on January 1, 2016, (6) + (8) + (10) + (12) + (14) but not less than 80% nor greater than 120% of (6)	$129,316,388
(16)	Ratio of actuarial value to market value	104.31%
(17)	Actuarial Value Return for 2014	10.47%
(18)	Actuarial Value Return for 2015	7.25%
(19)	Market Value Return for 2014	6.14%
(20)	Market Value Return for 2015	-1.19%

Funded Status and Appropriations (continued)

Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

Table VI	January 1, 2014	January 1, 2016
Actuarial Accrued Liability	$179,447,442	$205,524,287
Actuarial Assets	115,874,621	129,061,733
Unfunded Actuarial Accrued Liability	$63,572,821	$76,207,949
Funded Status	64.6%	62.9%

Funded Status and Appropriations (continued)

Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Sections 22D and 22F of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost
- Increasing amortization of the prior unfunded actuarial accrued liability by June 30, 2035
  $ 75,234,399 over 19 years with 4.0% increasing payments
- Level amortization of the 2002 Early Retirement Incentive by June 30, 2019
  $ 713,446 over 3 years
- Level amortization of the 2003 Early Retirement Incentive by June 30, 2020
  $ 260,104 over 4 years
- Interest adjustment for payments deposited each September 1

The pension appropriation is shown in Table VII.

Table VII	January 1, 2014	January 1, 2016
Normal cost	$1,278,863	$1,689,532
Amortization payment of the prior accrued liability	4,202,675	5,345,335
Amortization payment of 2002 ERI liability	256,334	255,771
Amortization payment of 2003 ERI liability	72,714	72,477
Total cost	$5,810,586	$7,363,115
% of Pay	20.1%	25.2%
Fiscal 2017 cost	$6,300,000	$6,300,000
Fiscal 2018 cost	$6,615,000	$7,616,072

Funded Status and Appropriations (continued)

Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 4.0% per year. The employee contribution rate is expected to increase to 10.5% by 2039 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to increase during the next 19 years until the unfunded liabilities are completely paid off, at which time only the normal cost will remain. The total cost represents 21.6% of payroll, increasing to 25.8% by the time the unfunded liabilities are fully paid off, leaving only a normal cost of 6.0% thereafter. The change in the cost as a percentage of payroll is a result of the increase in member deductions.

Funded Status and Appropriations (continued)

Appropriation Forecast (continued)

Fiscal Year Ending	Payroll[1]	Unfunded Accrued Liability[2]	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Funded Ratio %[3]
2017	$29,187,382	$76,207,949	$2,556,636	$1,775,734	$4,524,266	$6,300,000	21.6%	62.9%
2018	30,354,877	76,000,780	2,660,220	1,845,378	5,770,694	7,616,072	25.1	64.2
2019	31,569,072	75,547,171	2,768,000	1,917,752	6,584,573	8,502,325	26.9	65.6
2020	32,831,835	74,818,808	2,880,145	1,992,963	6,565,335	8,558,298	26.1	67.0
2021	34,145,109	74,060,407	2,996,834	2,071,123	6,748,727	8,819,850	25.8	68.3
2022	35,510,913	73,062,174	3,118,250	2,152,347	7,018,676	9,171,023	25.8	69.7
2023	36,931,350	71,717,061	3,244,584	2,236,756	7,299,423	9,536,179	25.8	71.1
2024	38,408,604	69,987,404	3,376,035	2,324,473	7,591,400	9,915,873	25.8	72.5
2025	39,944,948	67,832,190	3,512,811	2,415,628	7,895,056	10,310,684	25.8	74.1
2026	41,542,746	65,206,777	3,655,128	2,510,357	8,210,858	10,721,215	25.8	75.7
2027	43,204,455	62,062,599	3,803,210	2,608,799	8,539,292	11,148,091	25.8	77.5
2028	44,932,634	58,346,838	3,957,289	2,711,100	8,880,864	11,591,964	25.8	79.3
2029	46,729,939	54,002,082	4,117,610	2,817,411	9,236,099	12,053,510	25.8	81.3
2030	48,599,137	48,965,941	4,284,425	2,927,889	9,605,542	12,533,431	25.8	83.4
2031	50,543,102	43,170,647	4,457,998	3,042,698	9,989,764	13,032,462	25.8	85.6
2032	52,564,826	36,542,612	4,638,600	3,162,006	10,389,355	13,551,361	25.8	88.1
2033	54,667,419	29,001,954	4,826,519	3,285,991	10,804,929	14,090,920	25.8	90.7
2034	56,854,116	20,461,987	5,022,049	3,414,836	11,237,126	14,651,962	25.8	93.5
2035	59,128,280	10,828,667	5,225,498	3,548,730	11,686,611	15,235,341	25.8	96.6
2036	61,493,412	0	5,437,189	3,687,872	0	3,687,872	6.0	100.0

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[1] Calendar basis
[2] As of preceding January 1
[3] Beginning of Fiscal Year

Funded Status and Appropriations (continued)

Appropriation Forecast (continued)

Fiscal Year Ending	Payroll[1]	Unfunded Accrued Liability[2]	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Funded Ratio %[3]
2037	63,953,148	0	5,657,454	3,832,468	0	3,832,468	6.0	100.0
2038	66,511,274	0	5,886,641	3,982,731	0	3,982,731	6.0	100.0
2039	69,171,725	0	6,125,111	4,138,883	0	4,138,883	6.0	100.0
2040	71,938,594	0	6,373,239	4,301,154	0	4,301,154	6.0	100.0
2041	74,816,138	0	6,631,418	4,469,785	0	4,469,785	6.0	100.0
2042	77,808,783	0	6,900,054	4,645,025	0	4,645,025	6.0	100.0
2043	80,921,135	0	7,179,571	4,827,132	0	4,827,132	6.0	100.0
2044	84,157,980	0	7,470,409	5,016,376	0	5,016,376	6.0	100.0
2045	87,524,299	0	7,773,026	5,213,036	0	5,213,036	6.0	100.0
2046	91,025,271	0	8,087,900	5,417,403	0	5,417,403	6.0	100.0
2047	94,666,282	0	8,415,528	5,629,778	0	5,629,778	5.9	100.0
2048	98,452,933	0	8,756,425	5,850,475	0	5,850,475	5.9	100.0

[1] Calendar basis
[2] As of preceding January 1
[3] Beginning of Fiscal Year

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Funded Status and Appropriations (continued)

Cashflow Forecast

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

Plan Year Ending	Benefit Payments	Employee Contributions	Employer Contributions	Investment Returns	Net Change in Plan Assets
2016	$13,028,417	$2,556,636	$6,300,000	$10,873,605	$6,701,824
2017	12,912,019	2,660,220	7,616,072	10,371,766	7,736,039
2018	13,676,075	2,768,000	8,502,325	10,357,980	7,952,230
2019	14,481,687	2,880,145	8,558,298	10,926,080	7,882,836
2020	15,224,999	2,996,834	8,819,850	11,495,594	8,087,279
2021	16,011,425	3,118,250	9,171,023	12,080,787	8,358,635
2022	16,764,485	3,244,584	9,536,179	12,687,814	8,704,092
2023	17,519,313	3,376,035	9,915,873	13,321,066	9,093,661
2024	18,308,128	3,512,811	10,310,684	13,982,717	9,498,084
2025	19,132,459	3,655,128	10,721,215	14,673,839	9,917,723
2026	19,993,906	3,803,210	11,148,091	15,395,529	10,352,924
2027	20,894,140	3,957,289	11,591,964	16,148,909	10,804,022
2028	21,834,908	4,117,610	12,053,510	16,935,123	11,271,335
2029	22,818,034	4,284,425	12,533,431	17,755,334	11,755,156
2030	23,845,425	4,457,998	13,032,462	18,610,724	12,255,759
2031	24,919,076	4,638,600	13,551,361	19,502,494	12,773,379
2032	26,041,068	4,826,519	14,090,920	20,431,858	13,308,229
2033	27,213,578	5,022,049	14,651,962	21,400,039	13,860,472
2034	28,438,881	5,225,498	15,235,341	22,408,272	14,430,230
2035	29,719,353	5,437,189	3,687,872	23,477,266	2,882,974
2036	31,057,480	5,657,454	3,832,468	23,629,662	2,062,104
2037	32,455,856	5,886,641	3,982,731	23,715,350	1,128,866
2038	33,917,195	6,125,111	4,138,883	23,725,485	72,284
2039	35,444,331	6,373,239	4,301,154	23,650,369	(1,119,569)
2040	37,040,227	6,631,418	4,469,785	23,479,369	(2,459,655)
2041	38,707,979	6,900,054	4,645,025	23,200,845	(3,962,055)
2042	40,450,822	7,179,571	4,827,132	22,802,058	(5,642,061)
2043	42,272,137	7,470,409	5,016,376	22,269,074	(7,516,278)
2044	44,175,458	7,773,026	5,213,036	21,586,670	(9,602,726)
2045	46,164,477	8,087,900	5,417,403	20,738,213	(11,920,961)

Funded Status and Appropriations (continued)

GASB Statements No. 25 and No. 27

Effective for periods beginning after June 15, 1997, the Governmental Accounting Standards Board (GASB) required the disclosure of pension related liabilities for public employer financial statements in accordance with Statements 25 and 27. These statements, which replace GASB Statement No. 5, must be adhered to by any public employee retirement system that follows Generally Accepted Accounting Principles (GAAP). GASB 25 and 27 have been superseded for plan years and fiscal years beginning after June 15, 2013 and June 15, 2014, respectively. The information shown hereafter is for provided for comparison with prior years' results only. Information required under the new standards is presented separately.

Table VIII		January 1, 2014	January 1, 2016
(1)	Actuarial Accrued Liability	$179,447,442	$205,524,287
(2)	Actuarial Value of Assets	115,874,621	129,316,388
(3)	Unfunded Actuarial Accrued Liability	$63,572,821	$76,207,949
(4)	Funded Ratio: (2) / (1)	64.6%	62.9%
(5)	Covered Payroll	$28,945,300	$29,187,382
(6)	UAAL as a Percentage of Payroll: (3) / (5)	219.6%	261.1%
(7)	Annual Required Contribution (ARC)	$5,509,350	$6,300,000
(8)	Net Pension Obligation	$0	$0

Funded Status and Appropriations (continued)

PERAC Annual Statement

Appendix Page 3

Actuarial Valuation and Assumptions

The most recent actuarial valuation of the System was prepared by Conduent Human Resource Services as of January 1, 2016.

The normal cost for employees on that date was:	$2,556,636	8.8% of pay
The normal cost for the employer was:	1,689,532	5.8% of pay

The actuarial liability for active members was:	$93,875,220
The actuarial liability for retired and inactive members was:	111,649,067
Total actuarial accrued liability:	$205,524,287
System assets as of that date:	129,316,388
Unfunded actuarial accrued liability:	$76,207,949

The ratio of system's assets to total actuarial liability was: 62.9%

The principal actuarial assumptions used in the valuation are as follows:

Investment Return: 7.75%

Rate of Salary Increase:

Group 1	2.00% in year 2016, 3.50% in years 2017 – 2018, 4.00% thereafter
Group 4	2.00% in year 2016, 3.50% in years 2017 – 2018, 4.00% thereafter

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (b)	Unfunded Actuarial Accrued Liability (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a percent of Covered Payroll (b - a) / c
01/01/2016	$129,316,388	$205,524,287	$76,207,949	62.9%	$29,187,382	261.1%
01/01/2014	115,874,621	179,447,442	63,572,821	64.6%	28,945,300	219.6%
01/01/2012	106,181,870	162,639,000	56,457,130	65.3%	27,681,194	204.0%
01/01/2010	104,707,479	154,299,627	49,592,148	67.9%	27,433,458	180.8%
01/01/2009	110,478,130	141,758,527	31,280,397	77.9%	24,431,654	128.0%
01/01/2007	102,354,232	132,433,233	30,079,001	77.3%	24,258,365	124.0%
01/01/2005	87,818,592	120,595,047	32,776,455	72.8%	22,623,505	144.9%

GASB 67 and 68 Information

Summary of Significant Accounting Policies

Method used to value investments

Investments are reported at fair value.

Actuarial cost method

Entry Age Normal—Level Percent of Pay.

Plan Description

Plan administration

The City of Woburn, Massachusetts administers the Contributory Retirement System (Plan), a defined benefit pension plan that covers all employees of participating units except teachers, elected officials and those employees in service at the time of its establishment who elected not to become members. Eligible employees in the City who enter service on or after the date the System became operative for their classification may become members of the Retirement System on their own application.

Plan membership

As of January 1, 2016, pension plan membership consisted of the following:

Membership Status	Count	Total Expected Future Working Lifetime	Average
Retired paid from fund	432	0	
Terminated with deferred benefit	97	0	
Active	573	5,979	
Total	1,102	5,979	5.43

Benefits provided

Please see Section 4 of the report for a summary of plan provisions.

Contributions

The City establishes contributions based on an actuarially determined contribution recommended by an independent actuary. The actuarially determined contribution is developed using the Entry Age Normal Actuarial Cost Method. For the sponsor fiscal year ended June 30 2016, the City contributed $6,000,000 to the plan.

Investments

Rate of return

For the year ended December 31, 2015, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was estimated to be approximately (1.19)%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Receivables

No receivable contributions have been included in plan assets.

GASB 67 and 68 Information (continued)

Net Pension Liability

The components of the net pension liability at December 31, 2015 were as follows:

Components of Net Pension Liability	
Total pension liability	$ 205,524,287
Plan fiduciary net position	(123,972,843)
City's net pension liability	81,551,444
Plan fiduciary net position as a percentage of the total pension liability	60.32%

Pension Expense for the Sponsor's Fiscal Year ending June 30, 2016 based upon the December 31, 2015 Measurement Date

Pension Expense	Fiscal Year Ending December 31, 2015
Service Cost	$ 3,556,688
Interest Cost on Total Pension Liability	15,138,154
Differences between Expected and Actual Experience	706,375
Changes of Assumptions	1,886,500
Contributions-Member	(2,889,924)
Projected Earnings on Plan Investments	(10,180,212)
Differences between Projected and Actual Earnings	2,796,582
Administrative Expenses	567,097
Other	48,597
Total Pension Expense	$ $11,629,857

The difference between projected and actual investment earnings is recognized over five years, in accordance with the provisions of GASB 68. The differences between expected and actual experience and the effect of changes in assumptions are recognized over the average expected remaining service of all participants, which is 5 years. Since no valuation was performed at January 1, 2015, the estimated average expected remaining service for all participants has been determined to be 5.53 years, the average of the values at 2014 and 2016, which has been rounded to 5 years for expense determination purposes.

Actuarial Assumptions

The December 31, 2015 total pension liability was determined by using the following actuarial assumptions, applied to all periods included in the measurement:

Actuarial Assumptions	
Inflation	3.00%
Salary increases	See Exhibit 1
Investment rate of return	7.75%, net of pension plan investment expenses. This is based on an average inflation rate of 3.00% and a real rate of return of 4.75%.

GASB 67 and 68 Information (continued)

The long-term expected rate of return on Fund investments was determined using best-estimate ranges of expected future nominal rates of return (expected returns, net of investment expense and inflation) developed for each major asset class using an econometric model that forecasts a variety of economic environments and then calculates asset class returns based on functional relationships between the economic variables and the asset classes. Best estimates of arithmetic rates of return for each major asset class included in the pension plan's target asset allocation as of December 31, 2015 are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Equity	8.46%
Fixed income	1.83%
Alternatives	7.92%

Nominal long-term expected rates of return for these asset classes are equal to the sum of the above expected long-term real rates and the expected long-term inflation rate of 3.00%.

Discount rate

The discount rate used to measure the total pension liability was 7.75%. The projection of cash flows used to determine the discount rate assumed that City contributions will continue to follow the current funding policy. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Had there been a point where assets were projected to be depleted, a municipal bond rate of 3.20% would have been used in the development of the blended GASB discount rate after that point. The 3.20% rate is based on the S&P Municipal Bond 20 Year High Grade Rate Index.

Sensitivity of the net pension liability to changes in the discount rate

The following presents the net pension liability, calculated using the discount rate of 7.75%, as well as what the City's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.75%) or 1-percentage-point higher (8.75%) than the current rate:

	1% Decrease (6.75%)	Current Discount Rate (7.75%)	1% Increase (8.75%)
Net Pension Liability	$ 104,256,260	$ 81,551,444	$ 62,279,644

GASB 67 and 68 Information (continued)

Schedules of Required Supplementary Information

Schedule of Changes in City's Net Pension Liability and Related Ratios

	2016
Total pension liability	
Service cost	$ 3,556,688
Interest	15,138,154
Changes of benefit terms	0
Differences between expected and actual experience	3,531,873
Changes of assumptions	3,810,330
Benefit payments	(12,132,587)
Net change in total pension liability	$ 13,904,458
Total pension liability-beginning	$ 191,619,829
Total pension liability-ending (a)	$ 205,524,287
Plan fiduciary net pension	
Contributions-employer	$ 6,000,000
Contributions-employee	2,889,924
Net investment income	(1,511,397)
Benefit payments, including refunds of employee contributions	(12,132,587)
Administrative expense	(567,097)
Other	(48,597)
Net change in plan fiduciary net position	$ (5,369,754)
Plan fiduciary net position-beginning	$ 129,342,597
Plan fiduciary net position-ending (b)	$ 123,972,843
City's net pension liability-ending (a)-(b)	$ 81,551,444
Plan fiduciary net position as a percentage of the total pension liability	60.32%
Covered-employee payroll	$ 29,187,382
Net pension liability as a percentage of covered-employee payroll	279.41%

Notes to Schedule:

A. Benefit changes

None.

B. Changes of assumptions

The discount rate used to measure the total pension liability was changed from 8.00% to 7.75%.

The rates of salary increases were changed to 2.00% in year 2016, 3.50% in years 2017 and 2018, and 4.00% thereafter.

Note that the assumptions described in the exhibits indicate that the mortality improvement projection was revised for funding purposes. That change had already been implemented for GASB financial disclosure purpose in the preceding year's calculation, so there is no impact in these results.

GASB 67 and 68 Information (continued)

Schedules of Required Supplementary Information (continued)

Schedule of Contributions

	2016
Actuarially determined contribution	$ 6,000,000
Contributions related to the actuarially determined contribution	(6,000,000)
Contribution deficiency (excess)	$ 0

Notes to Schedule:

A. Valuation date

Actuarially determined contribution rates are calculated as of July 1, in the fiscal year in which contributions are reported. That is, the contribution calculated as of January 1, 2016 will be made during the fiscal year ended June 30, 2017.

B Methods and assumptions used to determine contribution rates:

Please see Section 3 of the report.

Schedule of Investment Returns

	2016
Annual approximate money-weighted rate of return, net of investment expenses	(1.19)%

GASB 67 and 68 Information (continued)

Table 1 - Projection of Fiduciary Net Position (000's omitted)

Fiscal Year Ending 12/31	Beginning Fiduciary Net Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Net Position
2016	$ 123,973	$ 2,557	$ 7,739	$ 13,029	$ 450	$ 9,485	$ 130,274
2017	$ 130,274	2,402	7,862	12,917	468	9,975	137,128
2018	$ 137,128	2,307	8,103	13,684	487	10,482	143,848
2019	$ 143,848	2,207	8,272	14,494	500	10,973	150,306
2020	$ 150,306	2,118	8,599	15,240	500	11,454	156,737
2021	$ 156,737	2,025	8,797	16,030	500	11,926	162,955
2022	$ 162,955	1,934	9,027	16,787	500	12,384	169,013
2023	$ 169,013	1,841	9,264	17,545	500	12,830	174,902
2024	$ 174,902	1,747	9,523	18,273	500	13,264	180,663
2025	$ 180,663	1,659	9,781	18,956	500	13,691	186,338
2026	$ 186,338	1,580	10,066	19,527	500	14,116	192,073
2027	$ 192,073	1,504	10,374	20,063	500	14,549	197,938
2028	$ 197,938	1,416	10,690	20,637	500	14,990	203,897
2029	$ 203,897	1,334	11,012	21,153	500	15,441	210,030
2030	$ 210,030	1,250	11,339	21,647	500	15,907	216,381
2031	$ 216,381	1,176	11,673	22,046	500	16,394	223,077
2032	$ 223,077	1,103	12,006	22,414	500	16,909	230,181
2033	$ 230,181	1,037	12,312	22,697	500	17,457	237,791
2034	$ 237,791	975	12,521	22,899	500	18,045	245,934
2035	$ 245,934	921	550	22,987	500	18,207	242,125
2036	$ 242,125	871	695	23,001	500	17,915	238,106
2037	$ 238,106	818	669	22,998	500	17,600	233,695
2038	$ 233,695	755	648	23,009	500	17,255	228,844
2039	$ 228,844	687	614	23,003	500	16,875	223,517
2040	$ 223,517	634	587	22,842	500	16,465	217,862
2041	$ 217,862	584	566	22,620	500	16,033	211,925
2042	$ 211,925	532	548	22,373	500	15,580	205,711
2043	$ 205,711	473	526	22,134	500	15,104	199,180
2044	$ 199,180	412	517	21,814	500	14,608	192,403
2045	$ 192,403	354	511	21,450	500	14,094	185,413
2046	$ 185,413	295	500	21,072	500	13,564	178,200
2047	$ 178,200	238	487	20,671	500	13,018	170,772
2048	$ 170,772	192	466	20,216	500	12,458	163,171
2049	$ 163,171	147	444	19,724	500	11,885	155,423
2050	$ 155,423	109	428	19,170	500	11,304	147,595
2051	$ 147,595	87	419	18,495	500	10,722	139,828
2052	$ 139,828	71	419	17,775	500	10,147	132,190
2053	$ 132,190	56	417	17,049	500	9,583	124,697
2054	$ 124,697	47	420	16,285	500	9,032	117,410
2055	$ 117,410	38	423	15,539	500	8,496	110,328

GASB 67 and 68 Information (continued)

Table 1 - Projection of Fiduciary Net Position (000's omitted) (continued)

Fiscal Year Ending 12/31	Beginning Fiduciary Net Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Net Position
2056	$ 110,328	29	425	14,797	500	7,975	103,460
2057	$ 103,460	23	428	14,059	500	7,472	96,825
2058	$ 96,825	18	416	13,325	484	6,986	90,434
2059	$ 90,434	14	386	12,610	452	6,518	84,290
2060	$ 84,290	9	360	11,927	421	6,068	78,378
2061	$ 78,378	6	333	11,243	392	5,637	72,720
2062	$ 72,720	4	308	10,588	364	5,223	67,303
2063	$ 67,303	2	284	9,950	337	4,829	62,132
2064	$ 62,132	1	261	9,324	311	4,452	57,212
2065	$ 57,212	1	239	8,724	286	4,094	52,537
2066	$ 52,537	1	219	8,151	263	3,754	48,096
2067	$ 48,096	0	199	7,603	240	3,431	43,883
2068	$ 43,883	0	181	7,077	219	3,125	39,893
2069	$ 39,893	-	163	6,576	199	2,835	36,116
2070	$ 36,116	-	147	6,095	181	2,562	32,549
2071	$ 32,549	-	131	5,634	163	2,303	29,186
2072	$ 29,186	-	116	5,191	146	2,060	26,025
2073	$ 26,025	-	102	4,764	130	1,831	23,065
2074	$ 23,065	-	89	4,350	115	1,618	20,306
2075	$ 20,306	-	77	3,950	102	1,420	17,753
2076	$ 17,753	-	66	3,562	89	1,237	15,405
2077	$ 15,405	-	56	3,190	77	1,069	13,264
2078	$ 13,264	-	47	2,833	66	917	11,329
2079	$ 11,329	-	39	2,493	57	781	9,600
2080	$ 9,600	-	32	2,173	48	659	8,070
2081	$ 8,070	-	26	1,876	40	552	6,732
2082	$ 6,732	-	21	1,604	34	459	5,575
2083	$ 5,575	-	17	1,359	28	379	4,584
2084	$ 4,584	-	13	1,143	23	311	3,742
2085	$ 3,742	-	11	953	19	253	3,034
2086	$ 3,034	-	8	789	15	204	2,442
2087	$ 2,442	-	6	648	12	164	1,952
2088	$ 1,952	-	5	529	10	131	1,548
2089	$ 1,548	-	4	430	8	103	1,218
2090	$ 1,218	-	3	346	6	81	949
2091	$ 949	-	2	278	5	63	731
2092	$ 731	-	1	221	4	48	556
2093	$ 556	-	1	174	3	36	417
2094	$ 417	-	1	135	2	27	307
2095	$ 307	-	0	103	2	20	223

GASB 67 and 68 Information (continued)

Table 1 - Projection of Fiduciary Net Position (000's omitted) (continued)

Fiscal Year Ending 12/31	Beginning Fiduciary Net Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Net Position
2096	$ 223	-	0	78	1	14	158
2097	$ 158	-	0	57	1	10	111
2098	$ 111	-	0	41	1	7	76
2099	$ 76	-	0	29	0	5	51
2100	$ 51	-	0	20	0	3	33
2101	$ 33	-	0	14	0	2	22
2102	$ 21	-	0	9	0	1	14
2103	$ 13	-	0	6	0	1	8
2104	$ 8	-	0	4	0	1	5
2105	$ 5	-	0	2	0	0	3
2106	$ 3	-	0	1	0	0	2
2107	$ 2	-	0	1	0	0	1
2108	$ 1	-	0	1	0	0	1
2109	$ 1	-	0	0	0	0	0
2110	$ 0	-	0	0	0	0	0
2111	$ 0	-	0	0	0	0	0
2112	$ 0	-	0	0	0	0	0
2113	$ 0	-	0	0	0	0	0
2114	$ 0	-	0	0	0	0	0
2115	$ 0	-	0	0	0	-	0

GASB 67 and 68 Information (continued)

Table 2 - Actuarial Present Values of Projected Benefit Payments (000's omitted)

Fiscal Year Ending 12/31	Beginning Fiduciary Net Position	Benefit Payments	Benefit Payments: Funded Portion	Benefit Payments: Unfunded Portion	Present Value of Benefit Payments: Funded Portion at 7.75%	Present Value of Benefit Payments: Unfunded Portion at 3.20%	Present Value of Benefit Payments: Using a Single Discount Rate of 7.75%
2016	$ 123,973	$ 13,029	$ 13,029	$ -	$ 12,552	$ -	$ 12,552
2017	130,274	12,917	12,917	-	11,548	-	11,548
2018	137,128	13,684	13,684	-	11,355	-	11,355
2019	143,848	14,494	14,494	-	11,161	-	11,161
2020	150,306	15,240	15,240	-	10,892	-	10,892
2021	156,737	16,030	16,030	-	10,633	-	10,633
2022	162,955	16,787	16,787	-	10,334	-	10,334
2023	169,013	17,545	17,545	-	10,023	-	10,023
2024	174,902	18,273	18,273	-	9,689	-	9,689
2025	180,663	18,956	18,956	-	9,328	-	9,328
2026	186,338	19,527	19,527	-	8,918	-	8,918
2027	192,073	20,063	20,063	-	8,503	-	8,503
2028	197,938	20,637	20,637	-	8,118	-	8,118
2029	203,897	21,153	21,153	-	7,722	-	7,722
2030	210,030	21,647	21,647	-	7,334	-	7,334
2031	216,381	22,046	22,046	-	6,932	-	6,932
2032	223,077	22,414	22,414	-	6,541	-	6,541
2033	230,181	22,697	22,697	-	6,147	-	6,147
2034	237,791	22,899	22,899	-	5,756	-	5,756
2035	245,934	22,987	22,987	-	5,362	-	5,362
2036	242,125	23,001	23,001	-	4,979	-	4,979
2037	238,106	22,998	22,998	-	4,621	-	4,621
2038	233,695	23,009	23,009	-	4,290	-	4,290
2039	228,844	23,003	23,003	-	3,981	-	3,981
2040	223,517	22,842	22,842	-	3,669	-	3,669
2041	217,862	22,620	22,620	-	3,372	-	3,372
2042	211,925	22,373	22,373	-	3,095	-	3,095
2043	205,711	22,134	22,134	-	2,842	-	2,842
2044	199,180	21,814	21,814	-	2,599	-	2,599
2045	192,403	21,450	21,450	-	2,372	-	2,372
2046	185,413	21,072	21,072	-	2,163	-	2,163
2047	178,200	20,671	20,671	-	1,969	-	1,969
2048	170,772	20,216	20,216	-	1,787	-	1,787
2049	163,171	19,724	19,724	-	1,618	-	1,618
2050	155,423	19,170	19,170	-	1,460	-	1,460
2051	147,595	18,495	18,495	-	1,307	-	1,307
2052	139,828	17,775	17,775	-	1,166	-	1,166
2053	132,190	17,049	17,049	-	1,038	-	1,038
2054	124,697	16,285	16,285	-	920	-	920
2055	117,410	15,539	15,539	-	815	-	815
2056	110,328	14,797	14,797	-	720	-	720
2057	103,460	14,059	14,059	-	635	-	635
2058	96,825	13,325	13,325	-	558	-	558
2059	90,434	12,610	12,610	-	490	-	490
2060	84,290	11,927	11,927	-	430	-	430

GASB 67 and 68 Information (continued)

Table 2 - Actuarial Present Values of Projected Benefit Payments (000's omitted) (continued)

Fiscal Year Ending 12/31	Beginning Fiduciary Net Position	Benefit Payments	Benefit Payments		Present Value of Benefit Payments		
			Funded Portion	Unfunded Portion	Funded Portion at 7.75%	Unfunded Portion at 3.20%	Using a Single Discount Rate of 7.75%
2061	78,378	11,243	11,243	-	377	-	377
2062	72,720	10,588	10,588	-	329	-	329
2063	67,303	9,950	9,950	-	287	-	287
2064	62,132	9,324	9,324	-	250	-	250
2065	57,212	8,724	8,724	-	217	-	217
2066	52,537	8,151	8,151	-	188	-	188
2067	48,096	7,603	7,603	-	163	-	163
2068	43,883	7,077	7,077	-	141	-	141
2069	39,893	6,576	6,576	-	121	-	121
2070	36,116	6,095	6,095	-	104	-	104
2071	32,549	5,634	5,634	-	89	-	89
2072	29,186	5,191	5,191	-	77	-	77
2073	26,025	4,764	4,764	-	65	-	65
2074	23,065	4,350	4,350	-	55	-	55
2075	20,306	3,950	3,950	-	47	-	47
2076	17,753	3,562	3,562	-	39	-	39
2077	15,405	3,190	3,190	-	32	-	32
2078	13,264	2,833	2,833	-	27	-	27
2079	11,329	2,493	2,493	-	22	-	22
2080	9,600	2,173	2,173	-	18	-	18
2081	8,070	1,876	1,876	-	14	-	14
2082	6,732	1,604	1,604	-	11	-	11
2083	5,575	1,359	1,359	-	9	-	9
2084	4,584	1,143	1,143	-	7	-	7
2085	3,742	953	953	-	5	-	5
2086	3,034	789	789	-	4	-	4
2087	2,442	648	648	-	3	-	3
2088	1,952	529	529	-	2	-	2
2089	1,548	430	430	-	2	-	2
2090	1,218	346	346	-	1	-	1
2091	949	278	278	-	1	-	1
2092	731	221	221	-	1	-	1
2093	556	174	174	-	1	-	1
2094	417	135	135	-	-	-	-
2095	307	103	103	-	-	-	-
2096	223	78	78	-	-	-	-
2097	158	57	57	-	-	-	-
2098	111	41	41	-	-	-	-
2099	76	29	29	-	-	-	-
2100	51	20	20	-	-	-	-
2101	33	14	14	-	-	-	-
2102	21	9	9	-	-	-	-
2103	13	6	6	-	-	-	-
2104	8	4	4	-	-	-	-
2105	5	2	2	-	-	-	-

GASB 67 and 68 Information (continued)

Table 2 - Actuarial Present Values of Projected Benefit Payments (000's omitted) (continued)

Fiscal Year Ending 12/31	Beginning Fiduciary Net Position	Benefit Payments	Benefit Payments		Present Value of Benefit Payments		
			Funded Portion	Unfunded Portion	Funded Portion at 7.75%	Unfunded Portion at 3.20%	Using a Single Discount Rate of 7.75%
2106	3	1	1	-	-	-	-
2107	2	1	1	-	-	-	-
2108	1	1	1	-	-	-	-
2109	1	0	0	-	-	-	-
2110	0	0	0	-	-	-	-
2111	0	0	0	-	-	-	-
2112	0	0	0	-	-	-	-
2113	0	0	0	-	-	-	-
2114	0	0	0	-	-	-	-
2115	0	0	0	-	-	-	-

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GASB 67 and 68 Information (continued)

Deferred Outflows/Inflows

	Liability Gain/Loss	Assumption Change	Investment Gain/Loss	Deferred Outflows	Deferred Inflows	Total
Amount Recognized						
2015	0	1,124,434	458,260	1,582,694	0	1,582,694
2016	706,375	1,886,500	2,796,582	5,389,457	0	5,389,457
2017	706,375	1,886,500	2,796,582	5,389,457	0	5,389,457
2018	706,375	1,886,500	2,796,582	5,389,457	0	5,389,457
2019	706,375	1,886,500	2,796,581	5,389,456	0	5,389,456
2020	706,373	1,470,457	2,338,321	4,515,151	0	4,515,151
2021	0	0	0	0	0	0
2022	0	0	0	0	0	0
2023	0	0	0	0	0	0
2024	0	0	0	0	0	0
2025	0	0	0	0	0	0
2026	0	0	0	0	0	0
2027	0	0	0	0	0	0
Deferred Balance						
2015	0	5,206,127	1,833,039	7,039,166	0	7,039,166
2016	2,825,498	7,129,957	10,728,066	20,683,521	0	20,683,521
2017	2,119,123	5,243,457	7,931,484	15,294,064	0	15,294,064
2018	1,412,748	3,356,957	5,134,902	9,904,607	0	9,904,607
2019	706,373	1,470,457	2,338,321	4,515,151	0	4,515,151
2020	0	0	0	0	0	0
2021	0	0	0	0	0	0
2022	0	0	0	0	0	0
2023	0	0	0	0	0	0
2024	0	0	0	0	0	0
2025	0	0	0	0	0	0
2026	0	0	0	0	0	0
2027	0	0	0	0	0	0

GASB 67 and 68 Information (continued)

Schedule A - Net Pension Liability Allocations as of June 30, 2015 and June 30, 2016 by Employer

	Fiscal Year Ended June 30, 2015		Fiscal Year Ended June 30, 2016				
Employer Name	Employer Proportion	Net Pension Liability	Employer Proportion	Proportionate Share of Total Contributions	Net Pension Liability	Net Pension Liability: 1% Decrease	Net Pension Liability: 1% Increase
City of Woburn	96.3400%	59,997,885	96.3100%	5,776,864	78,542,196	100,409,204	59,981,525
Woburn Housing Authority	3.6600%	2,279,347	3.6900%	223,136	3,009,248	3,847,056	2,298,119
Woburn Redevelopment Authority	0.0000%	0	0.0000%	0	0	0	0
Total	**100.0000%**	**$ 62,277,232**	**100.0000%**	**$ 6,000,000**	**$ 81,551,444**	**$ 104,256,260**	**$ 62,279,644**

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GASB 67 and 68 Information (continued)

Schedule B - Allocations of Pension Amounts as of June 30, 2016 by Employer

Employer Name	Employer Proportion	Net Pension Liability	Deferred Outflows of Resources: Difference Between Expected and Actual Experience	Changes in Assumptions	Changes in Benefits	Difference Between Projected and Actual Investment Earnings	Changes in Proportional Share Of Contributions
City of Woburn	96.3100%	78,542,196	2,721,237	6,866,862	0	10,332,200	0
Woburn Housing Authority	3.6900%	3,009,248	104,261	263,095	0	395,866	14,947
Woburn Redevelopment Authority	0.0000%	0	0	0	0	0	0
Total	**100.0000%**	**$81,551,444**	**$ 2,825,498**	**$ 7,129,957**	**$ 0**	**$ 10,728,066**	**$ 14,947**

Employer Name	Deferred Inflows of Resources: Difference Between Expected and Actual Experience	Changes in Assumptions	Changes in Benefits	Difference Between Projected and Actual Investment Earnings	Changes in Proportional Share Of Contributions	Difference Between Employer Contributions and Proportionate Share of Total Contributions
City of Woburn	0	0	0	0	14,947	0
Woburn Housing Authority	0	0	0	0	0	0
Woburn Redevelopment Authority	0	0	0	0	0	0
Total	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 14,947**	**$ 0**

GASB 67 and 68 Information (continued)

Schedule B - Allocations of Pension Amounts as of June 30, 2016 by Employer (continued)

Employer Name	Pension Expense Recognized: Proportionate Share of Pension Plan Expense	Pension Expense Recognized: Change in Proportional Share Of Contributions	Pension Expense Recognized: Total
City of Woburn	11,200,715	(3,737)	11,196,978
Woburn Housing Authority	429,142	3,737	432,879
Woburn Redevelopment Authority	0	0	0
Total	**$ 11,629,857**	**$ 0**	**$11,629,857**

GASB 67 and 68 Information (continued)

Schedule C - Employers’ Proportionate Share of the June 30, 2016 Deferred Outflows/Inflows

Employer Name	Fiscal Year Ending						
	June 30, 2016	June 30, 2017	June 30, 2018	June 30, 2019	June 30, 2020	Thereafter	Total
City of Woburn	5,190,586	5,190,586	5,190,586	5,190,585	4,348,542	-	25,110,885
Woburn Housing Authority	198,871	198,871	198,871	198,871	166,609	-	962,093
Woburn Redevelopment Authority	-	-	-	-	-	-	-
Total	**$ 5,389,457**	**$ 5,389,457**	**$ 5,389,457**	**$ 5,389,456**	**$ 4,515,151**	**$ 0**	**$ 26,072,978**

Exhibit 1 – Actuarial Methods and Assumptions

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below.

Member Data

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

Valuation Date

January 1, 2016.

Actuarial Cost Method

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

Rate of Investment Return

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.75% per annum.

Interest rate for accounting

7.75% per year, compounded annually. Projected benefit payments that are expected to be paid from available plan assets are discounted at the valuation interest rate of 7.75%. After the point where plan assets are not available to pay benefits, projected benefit payments are discounted at the municipal bond rate. The valuation rate for accounting purposes is the effective rate resulting from this process.

Municipal bond rate

3.20%. This rate is based on the S&P Municipal Bond 20 Year High Grade Rate Index as of December 31, 2015 the Measurement date for GASB 67 purposes.

Salary Scale

The assumed annual rates for salary increases including longevity are illustrated by the following rates:

Year	Rate
2016	2.00%
2017	3.50%
2018	3.50%
2019 and later	4.00%

Cost-of-Living Increases

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and $12,000 per year.

Value of Investments

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined using a five-year smoothing of asset returns greater than or less than the assumed rate of return, with a 20% corridor.

Exhibit 1 – Actuarial Methods and Assumptions (continued)

Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

Service	General Employees	Police and Fire Employees
0	0.1500	0.0150
10	0.0540	0.0150
20	0.0200	0.0000
30	0.0000	0.0000

Annual Rate of Mortality

RP-2000 Mortality Table projected generationally with Scale BB for males and females.

Exhibit 1 – Actuarial Methods and Assumptions (continued)

Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages:

	Male	Female	Male and Female
Age	General Employees	General Employees	Police and Fire Employees
45	0.0000	0.0000	0.0100
46	0.0000	0.0000	0.0100
47	0.0000	0.0000	0.0100
48	0.0000	0.0000	0.0100
49	0.0000	0.0000	0.0100
50	0.0100	0.0150	0.0200
51	0.0100	0.0150	0.0200
52	0.0100	0.0200	0.0200
53	0.0100	0.0250	0.0500
54	0.0200	0.0250	0.0750
55	0.0200	0.0550	0.1500
56	0.0250	0.0650	0.1000
57	0.0250	0.0650	0.1000
58	0.0500	0.0650	0.1000
59	0.0650	0.0650	0.1500
60	0.1200	0.0500	0.2000
61	0.2000	0.1300	0.2000
62	0.3000	0.1500	0.2500
63	0.2500	0.1250	0.2500
64	0.2200	0.1800	0.3000
65	0.4000	0.1500	1.0000
66	0.2500	0.2000	1.0000
67	0.2500	0.2000	1.0000
68	0.3000	0.2500	1.0000
69	0.3000	0.2000	1.0000
70	1.0000	1.0000	1.0000

Note that these retirement rates are currently applied to all active members. Due to the implementation of the new provisions and retirement eligibilities under Chapter 176, it is possible that future experience may warrant a different set of assumptions for those members hired on or after April 2, 2012.

Exhibit 1 – Actuarial Methods and Assumptions (continued)

Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

Attained Age	General Employees	Police and Fire Employees
20	0.0001	0.0010
30	0.0003	0.0030
40	0.0010	0.0030
50	0.0019	0.0125

In addition, it is assumed for the general employees that 40% of all disabilities are ordinary (60% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected). A load was applied to the accidental disability liability to account for the additional benefit payable for each dependent child upon the member's disability. Loads of approximately 2% and 11.7% were developed for Group 1 and Group 4, respectively, taking into account the higher likelihood of Group 4 accidental disabilities at younger ages, thus the likelihood of Group 4 having more dependent children than Group 1 accidental disability retirees.

Family Composition

It is assumed that 80% of all members will be survived by a spouse and that females (males) are three years younger (older) than members.

Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2014 is $450,000 and is anticipated to increase at 4.0% per year.

Future actuarial measurements

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions, applicable law or regulations. An analysis of the potential range of such future differences is beyond the scope of this certification.

Changes since the Prior Valuation

The discount rate changed from 8.00% to 7.75%.

The rates of salary increases were changed to 2.00% in year 2016, 3.50% in years 2017 and 2018, and 4.00% thereafter.

For funding purposes, the mortality rates applicable to non-disabled participants used for the prior valuation were based on the RP-2000 Mortality Table with projections specified by IRS Regulation 1.430(h)(3)-1, as applicable to the valuation year using a combined static table for both annuitants and non-annuitants. The mortality assumption applicable to non-disabled participants was changed to the RP-2000 Mortality Table projected generationally with Scale BB for males and females.

Exhibit 2 – Summary of Plan Provisions

This summary is prepared in accordance with Chapter 32 as of January 1, 2016, and does not take into account any subsequent changes.

Administration

Each of the 107 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

(i) Group 1: Most general employees in State and local government

(ii) Group 2: Certain specified hazardous duty positions

(iii) Group 3: State police officers and inspectors

(iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Salary

Salary is defined as gross regular compensation. Salary does not include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

Member Contributions

Member contributions vary depending upon date hired as follows:

Date of Hire	Member Contribution Rate
Prior to 1975	5.0% of Salary
1975 to 1983	7.0% of Salary
1984 to 1996	8.0% of Salary
1996 and Later plus	9.0% of Salary
1979 and Later	2.0% of Salary in excess of $30,000

The contribution rate for Group 1 participants hired on or after April 2, 2012 and who attain 30 years of service is reduced by three percentage points.

Exhibit 2 – Summary of Plan Provisions (continued)

Average Salary

Average salary is used to determine a participant's benefit. For those hired prior to April 2, 2012, it is defined as the average salary during the three consecutive-year period that produces the highest average. For those hired on or after April 2, 2012, it is defined as the average salary during the five consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years, or five years if hired on or after April 2, 2012, preceding retirement.) For those hired on or after January 1, 2011, salary taken into account for benefit purposes is capped at 64% of the IRC Section 401(a)(17) limit (indexed).

Creditable Service

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

Service Retirement

Eligibility

Group 1 members hired after April 1, 2012 are eligible for service retirement (also referred to as superannuation) upon attainment of age 60 and completion of ten years of creditable service.

For other members, one of the following conditions must be met:

(i) completion of 20 years of service

(ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member

(iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service

Benefit Amount

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following tables. The amount determined by the benefit formula cannot exceed 80% of the member's Average Salary. Any member who is a veteran also receives an additional annual retirement allowance of $15 per year of creditable service, not exceeding $300. This veteran allowance is paid in addition to the 80% maximum.

Exhibit 2 – Summary of Plan Provisions (continued)

For Actives Hired prior to April 2, 2012

Age at Retirement	Fraction of Average Salary		
	Group 1	Group 2	Group 4
65 or Over	.025	.025	.025
64	.024	.025	.025
63	.023	.025	.025
62	.022	.025	.025
61	.021	.025	.025
60	.020	.025	.025
59	.019	.024	.025
58	.018	.023	.025
57	.017	.022	.025
56	.016	.021	.025
55	.015	.020	.025
57	.014	.014	.024
53	.013	.013	.023
52	.012	.012	.022
51	.011	.011	.021
50	.010	.010	.020
49	.009	.009	.019
48	.008	.008	.018
47	.007	.007	.017
46	.006	.006	.016
45	.005	.005	.015
44	.004	.004	.004
43	.003	.003	.003
42	.002	.002	.002
41	.001	.001	.001

Exhibit 2 – Summary of Plan Provisions (continued)

For Actives Hired on or after April 2, 2012

	Group 1		Group 2		Group 4	
Age at Retirement	<30 Years of Creditable Service	30+ Years of Creditable Service	<30 Years of Creditable Service	30+ Years of Creditable Service	<30 Years of Creditable Service	30+ Years of Creditable Service
67 or over	.02500	.02500	.02500	.02500	.02500	.02500
66	.02350	.02375	.02500	.02500	.02500	.02500
65	.02200	.02250	.02500	.02500	.02500	.02500
64	.02050	.02125	.02500	.02500	.02500	.02500
63	.01900	.02000	.02500	.02500	.02500	.02500
62	.01750	.01875	.02500	.02500	.02500	.02500
61	.01600	.01750	.02350	.02375	.02500	.02500
60	.01450	.01625	.02200	.02250	.02500	.02500
59	N/A	N/A	.02050	.02125	.02500	.02500
58	N/A	N/A	.01900	.02000	.02500	.02500
57	N/A	N/A	.01750	.01875	.02500	.02500
56	N/A	N/A	.01600	.01750	.02350	.02375
55	N/A	N/A	.01450	.01625	.02200	.02250

Deferred Vested Retirement

Eligibility

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years. The benefit is payable upon attaining age 60 for Group 1 members hired after April 1, 2012 and age 55 for other members.

Benefit Amount

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

Refund of Contributions

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions. Members with ten or more years of service are entitled to 100% of the credited interest on their contributions. Members with five to ten years of service are entitled to 50% of the credited interest on their contributions. No credited interest is provided for members with less than five years of service.

Exhibit 2 – Summary of Plan Provisions (continued)

Disability Retirement

Accidental Disability

Eligibility

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

Benefit Amount

The accidental disability amount is 72% of annual salary plus $648.48 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

Ordinary Disability

Eligibility

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55).

Benefit Amount

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55. If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55, he will receive not less than the superannuation allowance to which he is entitled.

Survivor Benefits

Occupational Death

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

Non-Occupational Death

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of $250 per month to the surviving spouse, plus $120 for the first child, plus $90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of $250 per month plus $120 for the first child and $90 for each additional child.

Refund of Contributions

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

Exhibit 2 – Summary of Plan Provisions (continued)

Cost-of-Living Increases

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is $12,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

(i) Option A

Life annuity

(ii) Option B

Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member

(iii) Option C

Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

Section 3 – Plan Participant Data

Section 3 – Plan Participant Data

Age/Service Distribution with Salary as of January 1, 2016

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	2 35,682									2 35,682
20-24	12 28,142									12 28,142
25-29	31 34,240	4 37,327								35 34,593
30-34	38 45,841	16 59,166	2 49,324							56 49,772
35-39	7 31,579	12 50,978	8 65,979	4 77,341						31 53,871
40-44	10 31,829	11 61,849	9 58,644	16 74,152	1 45,442					47 58,687
45-49	12 30,641	17 37,509	11 61,722	13 65,140	15 73,830	6 82,710				74 55,876
50-54	21 31,238	17 39,391	23 39,232	15 42,853	8 67,576	20 83,942	7 82,605			111 51,067
55-59	10 46,957	14 23,378	31 38,845	24 39,093	6 76,077	15 73,941	14 95,369	1 88,244		115 51,550
60-64	1 20,238	2 47,209	14 39,135	14 45,584	3 42,365	7 53,780	2 47,339	6 102,087	5 88,976	54 54,747
65-69	1 9,896	9 34,319	3 37,838	8 50,895	2 53,748	2 39,497		1 53,511	2 141,713	28 48,674
70+	2 9,684	1 4,000	1 97,696	2 13,718		1 62,329			1 90,448	8 37,660
Total	147	103	102	96	35	51	23	8	8	573
Avg. Salary	36,017	43,009	46,067	52,046	68,130	74,549	87,308	94,285	102,344	50,938

Section 3 – Plan Participant Data (continued)

Retiree Distribution as of January 1, 2016

Attained Age	Number of Employees			Total Payments		
	Male	Female	Total	Male	Female	Total
< 20	1		1	70,001		70,001
20-24						
25-29						
30-34		1	1		68,090	68,090
35-39						
40-44	1		1	1,085		1,085
45-49						
50-54		2	2		66,029	66,029
55-59	13	10	23	481,221	120,795	602,016
60-64	26	19	45	1,300,169	408,222	1,708,390
65-69	47	41	88	2,342,178	865,422	3,207,600
70-74	25	28	53	792,924	542,900	1,335,824
75-79	22	25	47	591,592	364,918	956,510
80-84	25	37	62	538,429	465,470	1,003,898
85-89	19	32	51	344,549	332,773	677,322
90-94	3	15	18	33,814	126,290	160,105
95-99	4	1	5	40,789	4,153	44,942
100+						
Total	186	211	397	6,536,751	3,365,061	9,901,813
Average (Age/Payment)	72.7	75.6	74.2	35,144	15,948	24,942
Frequency Percent	46.9	53.1	100.0	66.0	34.0	100.0

Section 3 – Plan Participant Data (continued)

Disabled Retiree Distribution as of January 1, 2016

Attained	Number of Employees			Total Payments		
Age	Male	Female	Total	Male	Female	Total
< 20						
20-24						
25-29						
30-34						
35-39						
40-44						
45-49						
50-54	2		2	72,804		72,804
55-59	3		3	150,070		150,070
60-64	6	1	7	235,742	45,068	280,810
65-69	2		2	90,164		90,164
70-74	11		11	421,306		421,306
75-79	1		1	9,211		9,211
80-84	2		2	76,168		76,168
85-89	1		1	16,696		16,696
90-94	3		3	48,795		48,795
95-99	2	1	3	30,566	5,985	36,551
Total	33	2	35	1,151,522	51,053	1,202,575
Average (Age/Payment)	67.1	73.6	67.5	34,895	25,527	34,359
Frequency Percent	94.3	5.7	100.0	95.8	4.2	100.0

Exhibit 4 – Glossary of Terms

This glossary summarizes the technical terms contained in this report.

Actuarial Accrued Liability

That portion of the Actuarial Present Value of plan benefits that is not provided for by future employer Normal Costs or employee contributions.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting the Retirement System such as:

- Rates of investment returns
- Increases in a member's salary
- Inflation
- The probability of mortality, turnover, disablement
- Retirement at each age and other relevant items

Actuarial Cost Method

A procedure for allocating the Actuarial Present Value of pension plan benefits between Normal Cost and Actuarial Accrued Liability.

Actuarial Present Value

The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

Forecast

A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

Normal Cost

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

Valuation Method

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

Vested Liability

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.